Highs eastward and the only one that came from this region, V, had the least magnitude of all those charted and caused a maximum fall of only 11° during its progress. A general idea of the characteristics of these Highs may be found in the table at the beginning of this description, and the following details are given of the individual cases noted:

I.—On the first day of the month this High of slight magnitude was situated in North Dakota; it moved slowly south for a day and then turned to the northeast, disappearing in the Gulf of Saint Lawrence on the 5th. As it approached the coast it increased in magnitude and caused a widespread cold area along the coast, with the lowest temperature of the month. The temperature reached —12° at Northfield, Vt., a. m. of 4th.

II.—This High was first noted in Manitoba p. m. of 4th. It moved very slowly in an east-southeast course and passed off the middle Atlantic coast a. m. of 11th. The highest pressure of the month (30.76) east of the Rocky Mountains was observed at Green Bay, Wis., during its passage a. m. of 8th. The pressure steadily fell from this date to the 11th, reaching 30.24 at Washington City p. m. of 10th.

III.—Beginning with the 9th and continuing 5 days the pressure was abnormally high in the plateau region each day, reaching 30.76 at Winnemucca, Nev., on the 12th. From this a tongue of high pressure appeared reaching into Texas, which formed this High a. m. of 12th. It passed east to the eastern Gulf and then northeast, passing off the New Jersey coast on the 15th.

IV.—On the morning of the 14th this High seemed to come down to the north of Montana. From there it moved nearly east, passing off Nova Scotia on the 17th. The lowest temperature of the month in the Northwest occurred during the passage of this High, at Saint Vincent, —27°.

V.—This was the only High of the month that came directly from the plateau region. On the a. m. of the 16th the area of high pressure in this region showed a slight movement toward the east and a portion of it was cut off and moved east as a distinct High, merging with the Atlantic high area on the 20th.

VI.—It is probable that this High was in the west Gulf on the a. m. of the 22d, but its first definite appearance was in the p. m. of that date in western Florida. It moved northeast along the coast and was last noted on the 24th off Nova Scotia.

VII.—This High is also a partial off-shoot from the extended high area in the plateau region. It was first noted in Texas on the 23d and moved very slowly east, merging into the Atlantic high area on the 27th. II and VII had the lowest velocity noted this month, 16 miles per hour.

VIII.—This High came down to the north of Lake Superior on the 25th. Its motion was due east, continuing most of the time in Canada. It passed over Newfoundland on the 27th.

IX.—On the 26th there were evidences of a high area of some magnitude off the middle Pacific coast. This moved very slowly northward but did not come upon the land. On the a. m. of the 29th a tongue of high pressure shot out from this high area, extending from the north Pacific coast to Texas, and in the afternoon this High was separated off. It moved very rapidly (44 miles per hour) ene. and was last noted off Nova Scotia, afternoon of the 31st.

AREAS OF LOW PRESSURE.

An examination of Chart I, which shows the paths of all storms during this month, will show that the general tendency of the storms has been toward the northeast, 9 out of the 12 storms having disappeared near Nova Scotia. This general tendency of the storms has been due in part to the position of the permanent area of high pressure in the Atlantic, which has been near the south Atlantic coast. The pressure at Bermuda has been nearly .10 above the normal. This is also, in part, an explanation of the general high temperature east of the Mississippi. Only one of the storms originated in the Pacific, five in the region to the north of Montana, three in or very near Texas, one in Utah, and one off the South Atlantic coast.

I.—This storm, XIV of the December REVIEW, had moved from Manitoba to Kansas during the last days of December. It was central in Illinois on the 1st and moved in a northeast direction, passing off the Nova Scotia coast on the 3d. This was the most extensive storm of the month. The area included within the 30.00 isobar on the a. m. of the 1st was 1,900,000 square miles and that of ½-inch rainfall in 12 hours was 200,000 square miles. On the p. m. of the 1st the 30.00 area included 2,500,000 square miles and the heavy rainfall had divided, there being one centre in Tennessee and another entirely distinct in Michigan. The area of ½-inch rainfall was 140,000 square miles.

II.—On the 4th clouds and winds indicated a disturbance of very slight intensity off the south Atlantic coast. This storm skirted the coast for 3 days and passed off Nova Scotia on the 7th.

III.—On the morning of the 6th the winds showed a very slight storm in Texas, or rather the southern extremity of a trough of low pressure extending from Montana to Texas. It had a motion east to Louisiana for 5 days and from there ne., passing off the New Brunswick coast on the 13th. On the a. m. of the 11th the area within the 30.00 isobar was 1,700,000 square miles, and that of ½-inch rainfall in 12 hours, 40,000 square miles. As this storm approached the Atlantic coast its dimensions were markedly increased. On the morning of the 12th it stretched in oval shape from the north of Newfoundland to the south of Florida, and east to west from the 100th meridian to Bermuda. The pressure at Portland, Me., was 28.68, which has been equalled only once before at this station, on February 2, 1876.

IV.—This storm originated in the territory to the north of Montana and the path of its centre was just on the border of the United States till it reached Maine on the 14th. It disappeared in the Gulf of Saint Lawrence on the 15th. Very slight precipitation attended its course, the largest amount in 12 hours being 0.44 at Kingston, Ont., on the 14th. The lowest pressure was 29.38, at Marquette, Mich.

V.—Clouds and winds show a slight disturbance in Texas on the 14th, and by the morning of the 15th it had moved to the Gulf. As this storm approached the Atlantic, High III had moved to the south Atlantic, causing a pressure of 30.45 at Bermuda, and this high pressure deflected the storm along the Atlantic coast. It reached Newfoundland on the 20th.

VI.—This is the only storm of the month that came from the Pacific coast, and was of slight intensity throughout. It was first noted off Washington on the 15th. It moved a little south of east and was last noted over Lake Ontario on the 19th, as on the succeeding day it was merged in VII.

VII.—A disturbance of slight intensity was noted to the north of Montana on the 17th, the appearance being as though an increasing pressure in the rear of VI had prevented its coalition with this storm. The two storms moved separately till the 20th, when they were merged in one over Lake Michigan. On the p. m. of the 20th a trough of low pressure extended from the principal locus over Michigan to the west Gulf and two days later a circular storm of great extent had developed over Pennsylvania. This storm disappeared in the Gulf of Saint Lawrence on the 23d.

VIII.—This storm developed in west Texas on the 22d and moved east to the west Gulf, then northeast to Newfoundland on the 26th. The intensity of this storm was greatly increased as it approached and passed up the coast, being deflected north by the permanent Sargossa Sea high area. Freezing weather attended this storm and a large amount of sleet and snow fell in the middle and north Atlantic states on the 25th, impeding and interrupting telegraphic communication. See "Local storms."

IX.—This storm moved down to the north of Montana on the 23d. Its course was slightly south of east, passing off the Massachusetts coast on the 27th. The lowest pressure observed was 29.70, and the greatest precipitation in 12 hours, 0.24.

X.—Like the last this storm was of very slight intensity.

Its course was east, and it was last noted over Lake Superior on the 27th.

XI.—This storm may be regarded a secondary from the last and was first noted in Utah on the 26th. Its course at the first was to the southeast to Texas and then east-northeast to Newfoundland on the 31st. This storm was of wide extent and was remarkable in that the greatest precipitation in 12 hours was only 0.40, at Sydney, C. B. I., on the 30th.

XII.—This formed in the rear of the last storm and was first noted to the north of Montana on the 29th. It moved to the southeast and on the last day of the month was central in Michigan. As this storm approached the Mississippi Valley a long trough of low pressure was formed extending from Texas to Minnesota. The heaviest rainfall of the month attended this storm, there having fallen 3.24 in 12 hours at Memphis, Tenn., on the 31st.

NORTH ATLANTIC STORMS FOR JANUARY, 1891 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during January, 1891, are shown on Chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight storms have been traced for January, 1891, the average number for the corresponding month of the last 8 years being 10. Of the storms traced for the current month 6 were continuations of storms which first appeared over the North American continent, and 2 apparently originated over the western part of the ocean. One storm traversed the ocean from coast to coast. Storms of exceptional seasonal severity were not reported, and the weather was unusually fine over the eastern part of the ocean. A notable feature of the month was the high barometric pressure which prevailed over the eastern part of the ocean from the 12th to 15th, when readings above 31.00 (787) were noted west of the British Isles.

The month opened with a storm central northeast of Newfoundland, in which region it was located December 31st. Passing slowly eastward, attended by fresh to strong gales and pressure falling to about 29.30 (744) on the 2d, this storm reached the 25th meridian on the 4th, after which it apparently dissipated. On the morning of the 3d a storm of considerable strength was central over the Gulf of Saint Lawrence, whence it moved to southeast of Newfoundland by the morning of the 4th with an appreciable loss of energy, after which it apparently dissipated. On the morning of the 5th a storm appeared between Bermuda and the New England coast, with pressure below 29.50 (749) and heavy gales, whence it moved slowly east of north and reached Nova Scotia on the 7th, in which region it apparently disappeared by an increase of pressure. On the 8th a storm appeared off the southwest edge of the Banks of Newfoundland, and thence moved northeastward to the 40th meridian by the 10th, with fresh to strong gales and pressure falling below 29.30 (744), after which it disappeared north of the region of observation, where its presence was indicated by reports of the following date. On the 8th the pressure was low over the British Isles, and a storm was apparently central over or near the Hebrides. On this date a storm moved off the Texas coast over the northwest part of the Gulf of Mexico, and on the 9th was central off the middle Gulf coast. On the 10th a storm was central over the west part of the Gulf of Mexico, whence it moved northeastward and during the 11th advanced over the central valleys to the lower lake region. Severe gales were encountered off the south and middle Atlantic coasts attending the passage of this storm. During the 12th this storm passed over New England and the Canadian Maritime Provinces, with pressure below 28.70 (729) and heavy gales off the coast. At Saint John, N. B., the tide was reported the highest on record; wharves were flooded, warehouses were damaged, and low lands in the rear of the city were submerged. By the 13th this storm had disappeared north of Newfoundland beyond the region of observation. On this date an area of remarkably high pressure occupied the eastern part of the ocean, where readings above 30.80 (782) were reported from the Irish coast to the 25th meridian. By the 14th the pressure in that region had risen above 31.00 (787), and the pressure continued above that point along the 50th parallel between the 10th and 25th meridians during the 15th, after which there was a gradual decrease in pressure until the 20th, and during the remainder of the month the pressure continued low over and near the British Isles.

On the evening of the 15th a storm was central off the middle Gulf coast, and by the evening of the 16th had moved off the south Atlantic coast. By the 17th this storm had advanced off the middle Atlantic coast, and on the 18th was central off the New England coast, whence it passed to the south of Nova Scotia by the 19th, and on the morning of the 20th was southeast of Nova Scotia, with pressure about 29.30 (744) and fresh gales. From that region the storm moved east-northeast and disappeared north of the British Isles after the 23d, attended throughout by fresh to strong gales, and pressure falling to about 29.20 (742) on the 23d. On the 23d a storm which had advanced from the west Gulf, where it was central the evening of the 20th, moved eastward over the Gulf of Saint Lawrence, and by the 24th had advanced to the 40th meridian, with fresh to strong gales, after which it disappeared in the direction of Iceland. On the evening of the 24th a storm of considerable energy which advanced from the west Gulf was central on the North Carolina coast, whence it moved rapidly northeastward, passing south of Nova Scotia during the 25th, crossing Newfoundland during the early part of the 26th, and disappearing in the direction of Iceland after the 27th. This was the most destructive storm of the month along the coast of the United States, the most notable damage being the prostration of telegraph wires. The storm increased in energy as it advanced over the Canadian Maritime Provinces, where the pressure fell below 29.00 (737) at Saint John's, N. F., on the 26th, and the influence of the storm was felt over the middle and eastern parts of the ocean until the close of the month. On the morning of the 30th a storm which had advanced from the Lake region was central north of Nova Scotia, whence it moved over Newfoundland by the morning of the 31st, with pressure below 29.00 (737) and fresh to strong gales.

OCEAN ICE IN JANUARY.

On the 28th 3 large icebergs were reported in N. 46° 30′, W. 52° 46′, and on the 31st patches of soft ice were observed in N. 45° 50′, W. 59° 20′. In January, 1882 to 1888, inclusive, Arctic ice in small quantities was encountered east of Newfoundland, but in no case was it reported south of the 45th parallel. In 1889 no ice was reported. In 1890 vast fields of ice and enormous icebergs were reported over and near the Grand Banks north of the 43d parallel.

FOG IN JANUARY.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 5 dates; between the 55th and 65th meridians on 6 dates; and west of the 65th meridian on 2 dates. Compared with the corresponding month of the last 3 years the dates of occurrence of fog near the Grand Banks numbered the same as the average; between the 55th and 65th meridians 4 less than the average; and west of the 65th meridian 7 less than the average. On the dates fog was reported east of the 55th